2002 ANNUAL REPORT

Wisconsin Transportation Research

WISCONSIN
DEPARTMENT OF
TRANSPORTATION

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ANNUAL REPORT

Wisconsin Transportation Research

This is a report of research, development and technology transfer activities carried out by the Wisconsin Department of Transportation and its partners.

These projects and services are funded through the State Planning and Research Program of the Federal Highway Administration, U.S. Department of Transportation

For Federal Fiscal Year 2002—beginning October 1, 2001 and ending September 30, 2002

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U.S. Hwy 61 bridge over the Wisconsin River at Boscobel

Published February 2003

WISCONSIN TRANSPORTATION RESEARCH

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Frank Busalacchi
Secretary
Wisconsin Department of Transportation

"Investments in research, as outlined in this annual report, are key to learning to work smarter…"

New Times — New Challenges

When times are tough, I have always been an advocate of working harder ***and*** working smarter. In the challenging times that lie ahead of us here at the Wisconsin Department of Transportation, I believe we can not only survive, but also grow stronger.

Investments in research, as outlined in this annual report, are key to learning to work smarter—whether it's building longer lasting highways, improving transit system service, maintaining winter roads or repairing bridge decks in the most cost-effective way.

Our continued research partnership with the university system will assure us of access to some of the best civil engineering, planning, business and information specialists in the country. We will also work closely with private-sector construction and engineering firms to focus our research on the practical areas of greatest need.

We will rely on the extensive research generated each year by other state DOTs and by national organizations such as the Transportation Research Board of the National Academies and the American Association of State Highway and Transportation Officials. As outlined in the Future Strategic Highway Research Program (F-SHRP) for the coming five years, we will learn to work harder and smarter to:

- Renew Wisconsin's highways with minimal disruption.
- Make a significant improvement in highway safety.
- Provide a highway system with reliable travel times.
- Provide highway capacity in support of economic, environmental and social goals.

It won't be easy. But it's what we have to do and what we will do.

Gary Whited
Administrator
Division of Transportation Infrastructure Development

"We need to . . . use not only the results of our own research but also the innovations and successful practices of other states, national organizations and even other countries."

Developing Expertise and a Culture of Learning

Our agency has the very challenging task of delivering needed transportation projects to the people of Wisconsin—year after year—and then of operating and maintaining that system. This challenge can only be met with strong leadership and technical expertise based on the best available knowledge.

Our research program is one of the tools for developing expertise, along with our library, training programs and an overall culture of learning—and sometimes relearning. We will not be able to give our customers the highest quality, safest, most reliable and cost-effective transportation system without ongoing research.

This means not only conducting research but also making sure we communicate it and implement it into practice. We need to understand and use not only the results of our own research but also the innovations and successful practices of other states, national organizations and even other countries.

In late 2002 we launched a pilot information services program to help accomplish these goals by:

- Providing training in using the Internet and library resources to access technical information.
- Publishing concise, readable summaries and digests of new research.
- Responding quickly to internal customers with synthesis reports on pressing technical issues.
- Pushing current, relevant information to the desktops of managers and technical experts.

In the coming year we will evaluate the effectiveness of these efforts, modify them where needed and look for additional ways to support our technical experts as we face even more challenges in building, operating and maintaining the Wisconsin transportation system.

Putting Research to Work

I am pleased to introduce the *2002 Annual Report of Wisconsin Transportation Research.* In these pages we identify the valuable work of the dedicated investigators who design and carry out research studies. We hope this information is of interest to all Wisconsin residents, travelers and business operators who will benefit from the transportation improvements this research will bring.

We produce this report in particular for Wisconsin Department of Transportation employees and our partners in the construction and engineering industries who will put this research to work. WisDOT's research program is applied research. Every project is aimed at a problem that needs solving. While not all projects yield useable results, our overall program is strongly focused on implementation of the best that we learn into the department's processes and products.

I hope you enjoy reading and referring often in the coming year to these annual report features:

The big picture The charts on pages 4-7 compare budgets and project funding categories for 2002 and 2003. This year-to-year documentation helps us analyze trends and improve our funding and project-selection decisions.

A year of progress We learned much in 2002 about better ways to deliver information services to WisDOT managers and technical staff. On pages 8-10 we highlight pivotal events. More effective access to national research and that of other states saves us time and money. Our partnership with the WisDOT Library has led to the new Research and Library Web pages and a growing awareness of technical information readily available on the Internet and in our library.

Project details The new six-page Reference Guide in the center of the report provides a compact list of all 61 WisDOT-funded research projects and their timelines. Pooled fund projects and new projects for 2003 are also included. Copies of the foldout are available as a separate publication from our office.

Completed research On pages 11-18 We feature just a few of the 22 projects completed during 2002 thanks to the efforts of program and project managers of the Council on Research, the Technology Advancement Unit, the Wisconsin Highway Research Program and the Midwest Regional University Transportation Center.

Transportation knowledge network A national integrated network of transportation knowledge will be essential to WisDOT and all state transportation agencies in the coming decades. On page 19 we highlight our own and others' efforts to make this network a reality.

Partners Much can be accomplished by working together—WisDOT, FHWA, industry and academia. Here we list just some of the many individuals and organizations contributing to robust transportation research in Wisconsin.

Research Coordination Section Staff

Ann Pahnke
Program Analyst

Patrick Casey
CTC & Associates LLC

Nina McLawhorn
Research Administrator
Research Coordination Section

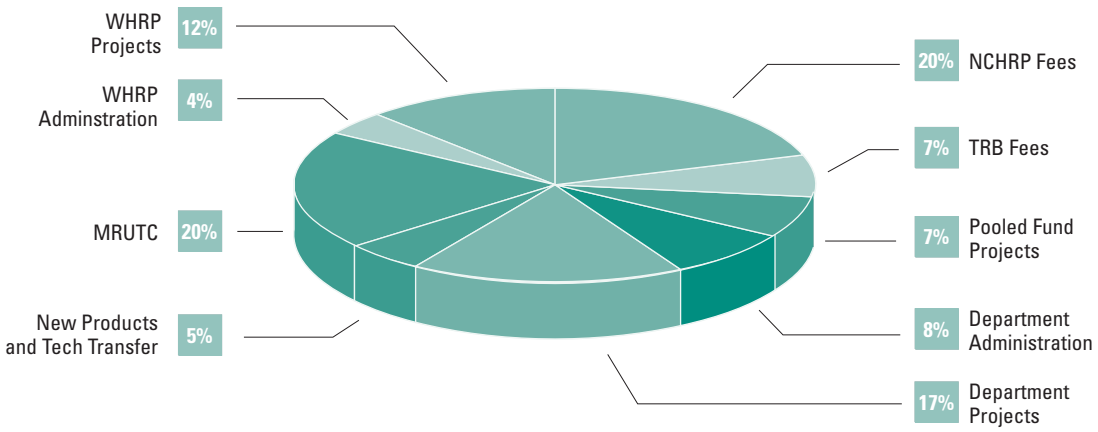
"WisDOT's research program is applied research. Every project is aimed at a problem that needs solving… our overall program is strongly focused on implementation of the best that we learn…"

RD&T on the Internet
www.dot.wisconsin.gov/library/research

RD&T on the dotnet
http://dotnet/dtidadmin/oas/research

FFY 2002 SPR BUDGET

$3,149,463



Revenues

Federal Funds	$2,813,906
State Funds	335,557
Total	**$3,149,463**

Expenditures

100% Federal Funds

NCHRP Fees	$ 633,914
TRB Fees	221,352
MRUTC	400,000
Pooled Fund Projects	216,414
	$1,471,680

80% Federal Funds/20% State Funds

Department Administration	$ 245,008
Department Projects	532,377
New Product Testing & Technology Transfer	145,213
MRUTC – DVCIC	250,000
WHRP Administration	133,509
WHRP Projects	371,676
	$1,677,783

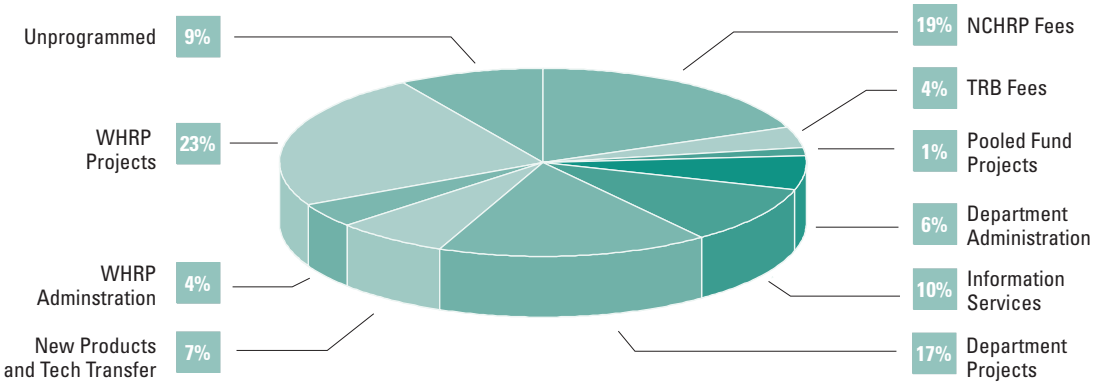
Total **$3,149,463**

Acronyms

COR	Council on Research
DVCIC	Deer-Vehicle Crash Information Clearinghouse
FFY	Federal Fiscal Year (10/1 through 9/30)
MRUTC	Midwest Regional University Transportation Center
NCHRP	National Cooperative Highway Research Program
RD&T	Research, Development and Technology Transfer
SPR	State Planning and Research
TAU	Technology Advancement Unit of the Bureau of Highway Construction
TEA-21	Transportation Equity Act for the 21st Century
WHRP	Wisconsin Highway Research Program

FFY 2003 SPR BUDGET

$3,025,084 (est.)



Estimated Revenues

Federal Funds	$2,564,000
State Funds	461,084
Total	**$3,025,084**

Estimated Expenditures

100% Federal Funds

NCHRP Fees	$568,987
TRB Fees	110,676
MRUTC	0
Pooled Fund Projects	40,000
	$719,663

80% Federal Funds/20% State Funds

Department Administration	$180,000
Department Projects	$506,203
New Product Testing & Technology Transfer	$210,000
WHRP Administration	$124,991
WHRP Projects	$714,180
Information Services	$300,000
Unprogrammed Funds	$270,047
	$2,305,421

Total **$3,025,084**

Federal SPR Funds for WisDOT Research

The Transportation Equity Act for the 21st Century provides annual funding to state departments of transportation for research, development and technology transfer. WisDOT has received the following research apportionments from State Planning and Research funds during the six-year life of TEA-21:

FFY 1998	$ 2,134,141
FFY 1999	$ 2,475,077
FFY 2000	$ 2,644,746
FFY 2001	$ 2,790,670
FFY 2002	$ 2,850,431
FFY 2003	$ 2,600,000 (est.)
Total	**$15,495,065**

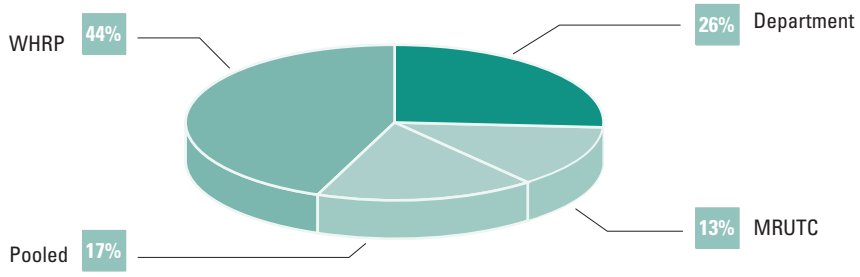
FFY 2002 PROJECT FUNDING

The Wisconsin Department of Transportation is dedicated to "creating transportation solutions through innovation and exceptional service." Effective research makes innovation possible. In order to continue improving our research efforts, we have taken as guiding principles the ***Seven Keys to Building a Robust Research Program.*** Published in 1999 by the National Cooperative Highway Research Program, this document (Synthesis Report 280) is a distillation of the best thoughts of DOT research managers, transportation agency administrators, industry leaders and academics from around the country regarding the attributes of robust research programs. These are the programs "that flourish and thrive, are vital and enduring, and that support the overall performance of the parent organizations."

Note: The charts on pages 6-7 show research project award amounts. Charts do not include program and administrative expenditures or NCHRP and TRB fees.

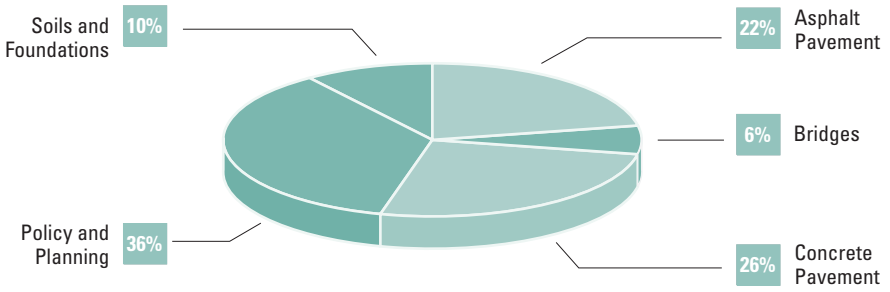
FFY 2002 Research Programs — Total Project Funding

$1,491,918



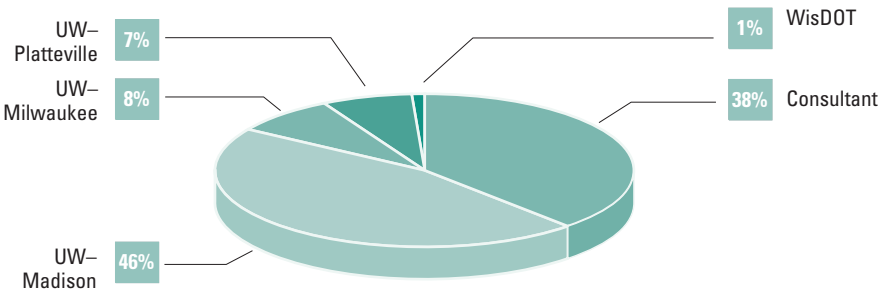
FFY 2002 Research Categories — Wisconsin Project Funding

$1,036,939



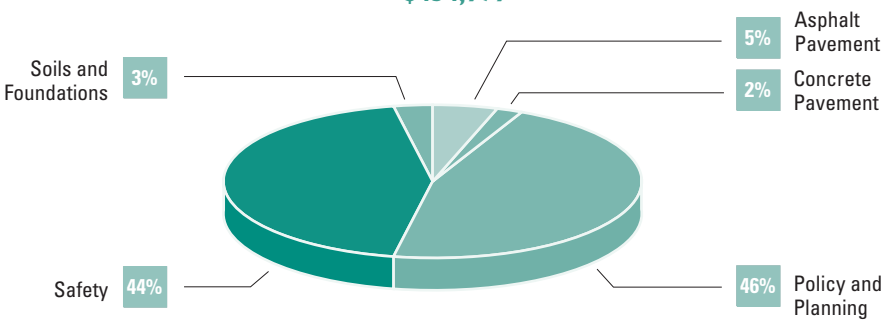
FFY 2002 Performing Organizations — Wisconsin Project Funding

$1,036,939



FFY 2002 Research Categories — Pooled Fund Project Funding

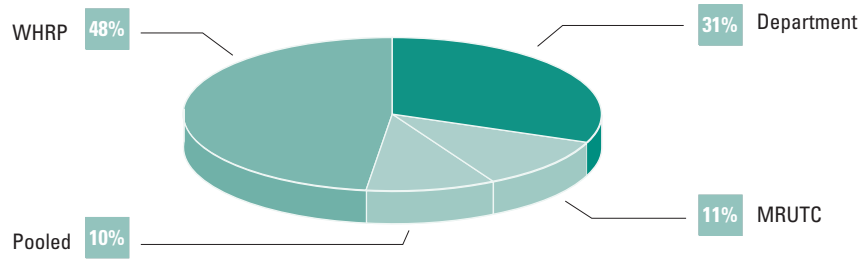
$454,979



FFY 2003 PROJECT FUNDING

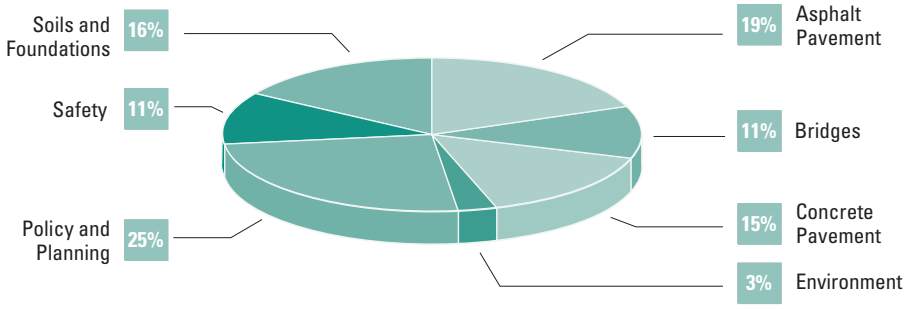
FFY 2003 Research Programs — Total Project Funding

$1,763,216 (est.)



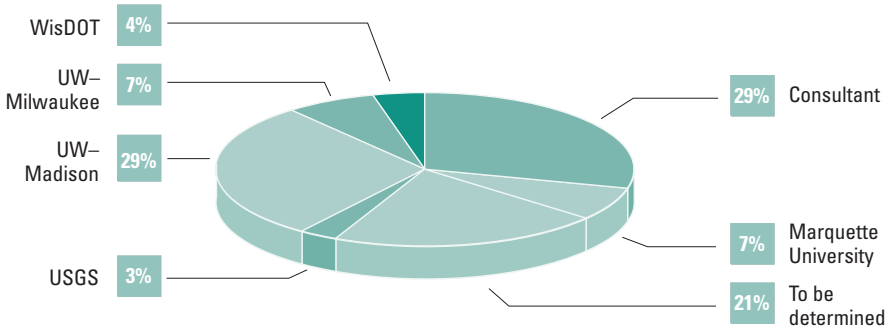
FFY 2003 Research Categories — Wisconsin Project Funding

$1,377,814 (est.)



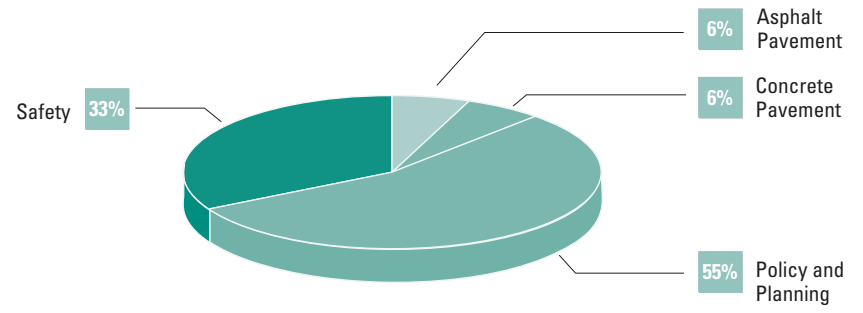
FFY 2003 Performing Organizations — Wisconsin Project Funding

$1,377,814 (est.)



FFY 2003 Research Categories — Pooled Fund Project Funding

$385,402 (est.)



7 Keys to Building a Robust Research Program

Found it on trust. Connect research to management concerns; assure management support for research efforts.

Market boldly at every stage of the process. Sell the need for and benefits of research to sponsors and users.

Root it in economics. Identify and quantify the economic benefits of research.

Make deals unabashedly. Form partnerships to leverage resources, access expertise and enhance credibility.

Insist on accountability from researchers, managers and partners.

Embrace policy research. Address strategic needs of management.

Empower the staff. Encourage generation of new ideas.

Mining the Internet for Transportation Resources

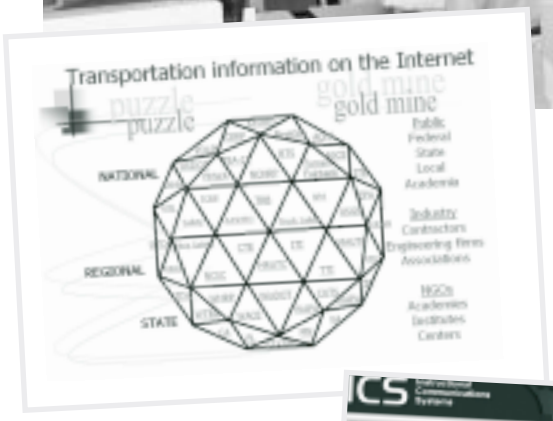
March through October

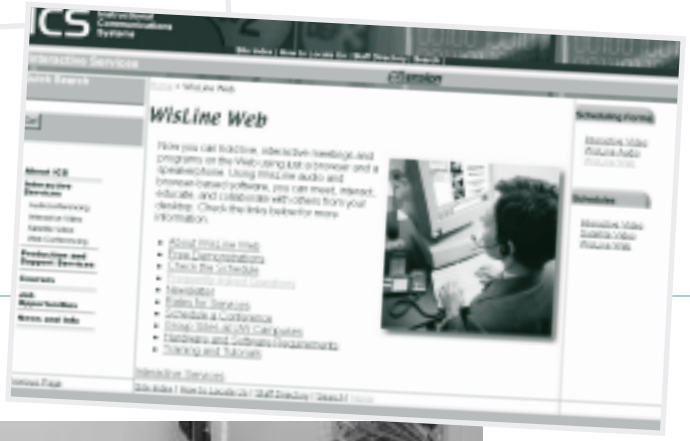
Technical information for transportation professionals is increasingly available on the Internet. To introduce WisDOT staff and others to the rich resources on the Web and in searchable databases, the RD&T Program offered nine half-day classes in 2002. Distance-learning versions of the class enabled District Office staff, industry partners and DOT personnel from other states to participate using their PCs, an Internet browser and a teleconference line.

Contact Patrick Casey at *pat.casey@dot.state.wi.us* for the 2003 schedule of classes or to arrange special sessions.

▲ Research Administrator ***Nina McLawhorn*** (top) and Technical Communications Consultant ***Patrick Casey*** introduced DOT personnel, such as this group from WisDOT's Bureau of Environment, to the vast and growing transportation resources on the Internet.

◀ The Mining the Internet class includes an introduction to the top 50 Transportation Web sites and effective ways to search for technical reports and new technologies online.





Wisline Web, available through UW-Extension's Instructional Communication Systems, enables participants in different locations to learn together, using browser-based software and a teleconference line. ▶

Peer Exchange on Information Services

April 9-11

Seven transportation professionals from other state DOTs, academia, the US DOT and the Transportation Research Board visited Madison to help WisDOT improve the information services component of its research program and increase the use of existing regional and national research. The team met with WisDOT central office and district staff as well as academia and industry to help identify needs and plan future actions. One result of the peer exchange is a 2003-2004 pilot program providing rapid-response research syntheses, electronic newsletters and other information services to DTID technical experts.

The peer exchange final report is available on the WisDOT Intranet at *http://dotnet/dtidadmin/oas/research/PeerEx.htm.*

◀ Visiting team members included: Pennsylvania DOT Research Director ***Robert Garrett*** (chair), Missouri DOT Director of Technology Transfer ***Michael Shea,*** Minnesota DOT Library Director ***Jerry Baldwin,*** National Transportation Library Director ***Nelda Bravo,*** Transportation Research Board Information Services Manager ***Barbara Post*** and University of Iowa Professor ***John Fuller***.

▲ WisDOT DTID Administrator ***Gary Whited*** (r) and FHWA Wisconsin Division Administrator ***Bruce Matzke*** (l) welcomed staff to Tuesday's Library Week theme in the Hill Farms main lobby: "There's a Transportation Engineer in All of Us."

Transportation Library Week

April 15-19

This weeklong observance was a cooperative effort of the RD&T Program, the WisDOT Library, the Office of Public Affairs and FHWA Wisconsin Division. Transportation libraries provide access to recent research and new technologies—saving time and money, and improving the quality of the transportation system.

See the wealth of information services available through WisDOT's Hill Farms Library at *http://www.dot.wisconsin.gov/library/services/.*

◄ WisDOT Librarians ***John Cherney*** (l foreground) and ***Wendy Brand*** (r) gave tips every day during lunch hour on finding transportation research resources on the Internet. Watching intently were ***Beth Cannestra,*** Bureau of Highway Development, and ***Steve Krebs***, Bureau of Highway Construction.

▲ Research Section Program Analyst ***Ann Pahnke***, (left) assisted ***Nina McLawhorn*** (right) in presenting the annual workshop to WisDOT project managers (l–r) ***Mitchell Warren***, DMV; ***Eileen Ostrowsky,*** DMV; ***Thomas Notbohm,*** DTID Bureau of Highway Operations; ***Anthony Allard,*** Green Bay District 3; ***Allyn Lepeska,*** Office of General Counsel; ***James Kraft,*** Waukesha District 2; ***John Nordbo***, DBM Office of Organizational Development Services; ***John Etzler***, DTIM Public Transit Section; ***Jeffrey Knupp,*** DMV.

Project Manager Workshop

May 21

WisDOT staff who manage research projects assure that the research stays focused on the original objectives, finishes on time and is implemented into practice. At this annual workshop, Research Administrator Nina McLawhorn and her staff provide project managers with background on the State Planning and Research program, WisDOT purchasing/contracting procedures, and resources available through the Research Section.

The *Project Managers Manual* and other information are available on the WisDOT Intranet at *http://dotnet/dtidadmin/oas/research/COR.htm.*

Midwest Conference on Library and Information Services for Transportation

August 14-16

This conference, held at UW-Madison's Midwest Regional University Transportation Center, was an opportunity for information providers to discuss needs and services with information users. Transportation librarians and other information specialists from throughout the region joined WisDOT engineers and other practitioners in a dialogue about improving access to existing technical information in order to speed the process of innovation.

Conference presentations are available on the MRUTC Web site at *www.mrutc.org/libraryinfo.*

Transportation librarian panel members reported on national activities (l–r): ***Nelda Bravo,*** National Transportation Library; ***Roberto Sarmiento,*** Northwestern University Transportation Library; ***Sandy Tucker,*** Texas Transportation Institute; ***Dave Dubov,*** AASHTO. ►

WisDOT DTID Administrator ***Gary Whited*** (l) joined a panel of practitioners after his presentation to the conference, "Information Services: Getting Research Results to the People Who Need to Know." ▼

◄ ***Brad Mallory,*** PENNDOT secretary and AASHTO president, participated by video-conference with PENNDOT Research Director ***Bob Garrett.*** Secretary Mallory urged attenders to seize opportunities to enhance information services for transportation. Panelists (l–r) ***Mark Sandifer,*** FHWA Midwest Resource Center, and ***Steve Pudloski,*** UW-Madison Transportation Information Center gave state and regional perspectives.

▲ Conference attendees discussed ways to raise awareness of the importance of information services to the transportation industry and planned future actions to improve coordination and sharing of data and information.

New Research & Library Internet pages

October

As part of the growing partnership between the RD&T Program and the WisDOT Library, the department's redesigned Internet Web site includes a major new Research & Library section. These Web pages feature full-text access to the department's research reports, briefs, newsletters and annual reports; descriptions and status reports on the pooled fund projects to which we contribute; and updates on NCHRP projects that were given a high rating on the annual ballot of continuing and new projects. In addition, the pages offer extensive links to online publications, Web sites and databases, organized by format, topic and state.

Begin every search for transportation information at *www.dot.wisconsin.gov/library.*

COUNCIL ON RESEARCH

The Council on Research (COR), composed of representatives from WisDOT's divisions and offices, works with the Research Coordination Section to select research proposals in areas such as policy and planning, operations, safety, transit and environment.

The three projects highlighted here are among the 12 COR projects completed in FFY 2002. WisDOT staff and research partners are encouraged to suggest research topics that advance the mission of the department. Ideas should be submitted to the appropriate Council on Research division representative.

Division of Business Management
Jeffrey Western, jeffrey.western@dot.state.wi.us

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Bonnie Anderson
bonnie.anderson@dot.state.wi.us

Division of State Patrol
Daniel McGuire, daniel.mcguire@dot.state.wi.us

Division of Transportation Districts
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ron.adams@dot.state.wi.us

Division of Transportation Investment Management, *Rod Clark*
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Executive Offices, *Joe Maassen*
joe.maassen@dot.state.wi.us

Mission

Guide, promote, prioritize and evaluate WisDOT's research, development and technology transfer (RD&T) activities as tools for achieving departmental goals.

Guiding Principles

- Provide input and a department-wide perspective to the work of the Research Coordination Section.
- Promote, prioritize and evaluate department RD&T activities.
- Help to nurture a learning environment for WisDOT employees that will lead to increased awareness and use of existing research and best practices; effective analysis of research data and trends; use of the most appropriate and cost-effective contracting options; and clear communication of research results.

Freeway Sweeping to Reduce Runoff Pollutants

Project 0092-45-82

COMPLETED

WISDOT IS WORKING HARD to improve the quality of storm water runoff from the state highway system. Highway runoff may contain heavy metals, inorganic salts, aromatic hydrocarbons or suspended solids that accumulate on the road surface from cars and trucks and from highway maintenance activities such as salting and sanding.

This research project was designed to determine whether street sweeping of highways could improve the quality of storm water runoff and, if so, to what degree. The study is believed to be the most complete effort to document the use of a high efficiency sweeper program on an urban freeway section. The area selected for the project was one of Wisconsin's busiest stretches of interstate (daily traffic count of 133,900) on I-894 just west of Milwaukee.

WisDOT investigators chose a 10-acre drainage basin along the highway and further divided it into test and control basins with a buffer area between the two. Runoff from both basins empties into a storm water collection system flowing into the Milwaukee Metropolitan Sewerage District system. During the study, the inside and outside shoulders of the test area were swept two to three times per month over the 11 months from May 1999 to March 2000, for a total of 35 sweeping operations. The control area received no sweeping.

Comparison of lab analyses of runoff samples taken from test and control sections indicated that sweeping resulted in improved water quality, although investigators were only able to quantify the improvement within a broad range. The data indicated that a once-per-week sweeping program could be an effective storm water runoff best management practice for urban freeways. WisDOT is planning more research to quantify the beneficial effects of sweeping and possibly propose guidelines for a statewide freeway sweeping program.

The final report and brief are online at *www.dot.wisconsin.gov/library/research/reports/environment.htm.*

For more information contact Tom Martinelli at *thomas.martinelli @dot.state.wi.us.*

COUNCIL ON RESEARCH

Driver Perspectives on ITS Traveler Information

Project 0092-02-12

COMPLETED

The final report and brief are online at *www.dot.wisconsin.gov/library/research/reports/its.htm.*

For more information contact John Corbin at *john.corbin@dot.state.wi.us*

INTELLIGENT TRANSPORTATION Systems (ITS) such as changeable message signs (CMS), dynamic route guidance, closed-circuit video of traffic conditions, cellular 911 services and highway advisory radio give travelers information to enhance highway safety and usability.

This project looked at how drivers perceived these various strategies. Aimed at developing an easy-to-scan digest of existing research, this was one of the first "review studies" undertaken through the RD&T Program. It was designed to be a quick-turnaround, six-month effort, at moderate cost.

UW–Milwaukee investigators, led by Dr. Alan Horowitz, reviewed 158 research reports and journal articles and carried out interviews with FHWA, state DOTs and research centers nationwide. Their final report includes an annotated bibliography of print and Web documents and an executive summary that identifies what drivers want most, based on existing research. Independent of media or technology, drivers want to know: what's the problem, how long is the delay, what's the alternative, and how does that compare with the delay itself?

Reviewers concluded, on the basis of existing research, that existing media such as radio, television and CMS are very popular (used by 60-80% of commuters), even though their current usefulness is limited; improving existing media may be a powerful tool at modest cost; no single information format is useful to all trips; the highest demand for information is by commuters and by drivers on special trips.

WisDOT traffic planners and engineers are already using this digest to help plan future ITS implementation and research.

Measuring Customer Satisfaction

Project 0092-02-07

COMPLETED

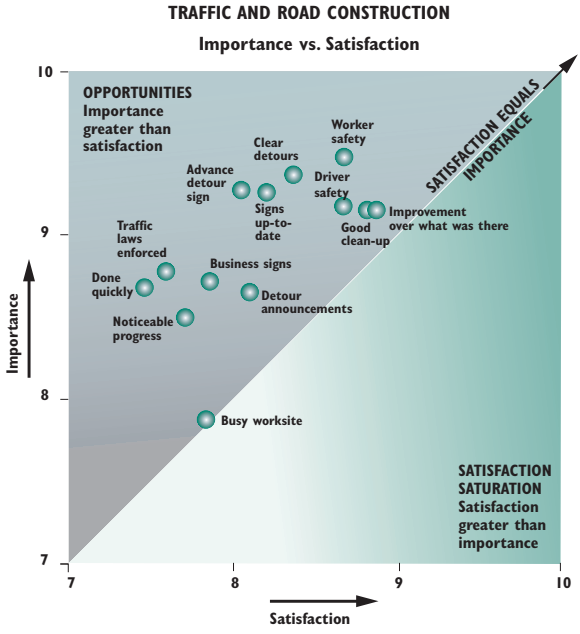
The final report and brief are online at *www.dot.wisconsin.gov/library/research/reports/policy.htm.*

For more information contact John Nordbo at *john.nordbo@dot.state.wi.us.*

ALTHOUGH FEEDBACK mechanisms are in place for some customer groups, WisDOT currently has no formal mechanism for measuring the general public's satisfaction with our products and services. To address this problem, the WisDOT board of directors initiated a research project to develop a customer satisfaction survey mechanism to help guide decisions about programs and services.

The consultants hired for the study, Virchow Krause & Comapny, developed a telephone survey mechanism of Wisconsin residents who have had various kinds of interactions with the department. Participants will be asked to rate the importance of specific services and then rate their satisfaction with each during a recent experience.

A gap analysis will then be developed from the survey results, comparing what customers feel is important against how well they think WisDOT performs. One of the charts, using limited data from a pilot test of the new customer satisfaction mechanism, is shown at right, indicating that, while satisfaction is relatively high (above 7 on a scale of 1 to 10), it's not as high as the level of importance assigned by survey respondents. The first full-scale survey is planned for late 2003.



Gap analyses like this sample will help WisDOT addresss the areas of greatest need.

New COR Projects — FFY 2003

0092-00-03

Additional funding for Evaluation of Storm Water Treatment Technologies for Highway Runoff

Investigators are evaluating two storm water treatment devices for runoff coming exclusively from I-94 and discharging into the Milwaukee River. Contaminant levels of inlet and outlet water for approximately 30 storms are being tested. The primary objective is to determine the pollutant removal effectiveness of a Vortechnics storm water treatment system, and a StormFilter treatment system.

0092-03-01

Examining Stress Levels of DSP Enforcement Personnel and Intervention Techniques – Phase II

The initial study (0092-01-07) found that 51% of sworn personnel experience stress due to organization stressors. This phase will develop mitigation strategies to reduce stress. If intervention strategies are successful, employees will be more responsive and customer service orientated, and enjoy increased job satisfaction.

0092-03-02

Inventory of Electronic Judicial Systems in Wisconsin

The investigator will inventory local law enforcement and municipal court computer systems used to transmit electronic data (citation, convictions, and adjudication) to the Division of Motor Vehicles. The investigator will recommend new DMV strategies to save time and money by electronically updating driver records rather than by processing paper forms.

0092-03-03

Chevron Marker Study

This project will provide input to the design and implementation of any new chevron pavement marking patterns. The objective will be the analysis of the data and evaluation of the effectiveness of the chevron pavement marking pattern to reduce vehicle speeds and speed-related crashes.

0092-03-04

Snow Drifting Study

Investigators will test existing snowdrift formulas to identify the correct height, offset and type of snow fence that would be most effective on causeway structures where blowing snow creates safety and maintenance problems. The potential research payoff is a safer roadway and signficant savings in winter maintenance costs and user delay costs.

0092-03-06

Highway 29 Impact (from Abbotsford to Green Bay)

The project will evaluate the actual and potential economic and land use impacts of recently constructed capacity improvements along this segment of Hwy 29, the first highway nationally to be studied using an economic model to forecast the economic benefits of capacity improvements.

The methodologies and analytical tools used in the study will provide insight as to the types and levels of economic activity along other highway segments with anticipated capacity improvements.

0092-03-07

Transit Benefit Sector Analysis

The impacts (costs/benefits) of transit to specific economic sectors (e.g., education, retail, manufacturing and medical) in Wisconsin remain largely unknown and unquantified. This detailed sector analysis will assess the importance of transit to Wisconsin communities and the state's continued economic growth.

0092-03-08

WISLR Communication Analysis

The project will develop a toolbox of communication strategies to use with almost 2,000 local units of government that receive $600 million annually through 15 WisDOT funding programs. Lessons learned from the project will provide critical guidance for future outreach efforts on the pavement condition assessments of the Wisconsin Information System for Local Roads (WISLR) and other efforts.

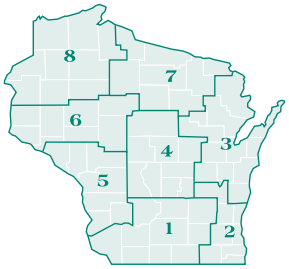
See *Research Project Guide* for funding details and contact names.

The Federal Communications Commission designated 511 as the nation's travel information number, with state departments of transportation responsible for leading implementation.

The Division of Transportation Investment Management at WisDOT is currently studying the best ways to deploy a 511 traveler information system in the Gary-Chicago-Milwaukee corridor and throughout Wisconsin.

For more information contact Phil DeCabooter at *phil.decabooter@dot.state.wi.us.*

TECHNOLOGY ADVANCEMENT UNIT



The Technology Advancement Unit (TAU) is part of the Pavements Section of WisDOT's Bureau of Highway Construction (BHC) in the Division of Transportation Infrastructure Development (DTID). Located at the Truax Center, TAU's mission is to support WisDOT strategic directions by addressing both existing and anticipated future needs of Wisconsin's transportation system. TAU's responsibilities are concentrated in pavement studies and evaluations, technology advancement and new products.

TAU engineers coordinate WisDOT participation in the following national research and technology transfer programs:

- National Transportation Product Evaluation Program (NTPEP)
- Highway Innovative Technology Evaluation Center (HITEC)
- Strategic Highway Research Program (SHRP)
- Long Term Pavement Performance (LTPP) and Special Pavements Studies (SPS)
- Federal Experimental Projects Program

Technology Advancement Steering Committee (TASC)

The Technology Advancement Steering Committee provides a forum for communication between TAU and representatives from the eight district offices in the Division of Transportation Districts, other DTID bureaus, the Federal Highway Administration, the University of Wisconsin, and other agencies.

Stone Matrix Asphalt—The Wisconsin Experience

Project 0092-45-87

COMPLETED

The final report is online at *www.dot.wisconsin.gov/library/research/reports/asphalt.htm.*

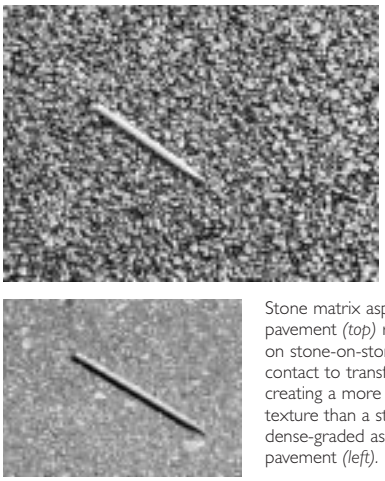
For more information contact Debra Bischoff at *debra.bischoff@dot.state.wi.us.*

STONE MATRIX ASPHALT (SMA) pavements have been used in Europe for more than 20 years. They are tough, stable pavement mixtures characterized by gap-graded aggregates, high asphalt contents and polymer or fiber additives for stabilizers. The result is a densely compacted wearing surface. To evaluate SMA potential for Wisconsin, WisDOT launched this research project in the early 1990s in partnership with the Federal Highway Administration and the Wisconsin asphalt paving industry.

Thirty-six test sections were constructed at six different sites around the state to evaluate the relative ease of construction of various SMA pavements and to compare their performance over a five-year period against the standard dense-graded asphalt mix. Performance was measured in the areas of cracking, friction characteristics, overall pavement distress, rutting, noise and ride.

Conclusions of this 2002 report are that SMAs are performing better than standard asphalt pavements in the important areas of crack and distress generation. Cracking was 30 to 40 percent less than for standard dense-graded asphalt pavements in most cases. Both types of pavement show equally good rut-resistant capabilities. Ride on an SMA pavement is generally rougher when compared with a standard asphalt pavement. Performance trends suggest that SMA pavements may have a longer service life, although the study has produced no hard evidence of this to date. The cost-effectiveness of the more expensive SMAs was not evaluated in this study.

It should be emphasized that the SMA pavements evaluated in this study were first generation mixes with which contractors and WisDOT had little experience at the time of construction. SMA technology since the early 1990s has improved, here in Wisconsin and nationally, resulting in better specifications, improved SMA mixes and fewer problems associated with construction. WisDOT is currently using fourth generation SMA mixes, which are being evaluated for improved performance.



Stone matrix asphalt pavement *(top)* relies on stone-on-stone contact to transfer load, creating a more open texture than a standard dense-graded asphalt pavement *(left)*.

Pouring Concrete in February

Can the highway construction season be extended into colder months—permitting concrete paving during off-peak travel months? To help answer this question WisDOT's Technology Advancement Unit sponsored one of the first two pavement field trials of an innovative antifreeze technology that allows concrete to cure in below-freezing temperatures.

The February 2002 demonstration was part of pooled fund study *TPF-5(003), Extending the Season for Concrete Construction and Repair.* Paving was performed by the Oneida County Highway Department in partnership with Rhinelander Transportation District 7, the Army Corps of Engineers Cold Regions Research and Engineering Laboratory (CRREL), and Musson Concrete of Rhinelander.

The antifreeze admixture, developed by CRREL's Charles Korhonen from commercially available admixtures, depresses the freezing point of water and accelerates the hydration rate of the cement. The demonstration was carried out in Wisconsin while the thermometer was at 22°F, with no heating of the workspace or water; a standard insulating blanket was used to cover the slab after pouring.

The repaved lane was opened to traffic approximately 48 hours after placing the concrete. No cracks or other signs of distress were noted, and laboratory cylinder tests showed that the concrete met minimal acceptable compressive strength requirements of 3,000 psi.

WisDOT will continue to evaluate this technology as more experience is gathered in Wisconsin and other states through the pooled fund study.

Winter concrete paving operations like this demonstration at Rhinelander may become more common with new antifreeze technology.

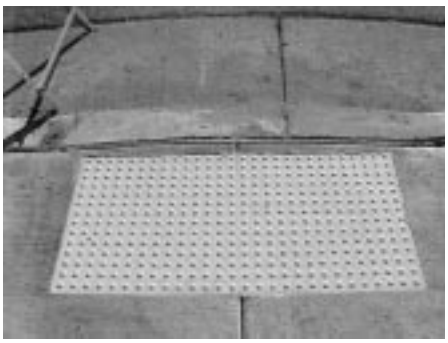
For more information contact TAU engineer Peter Kemp at peter.kemp@dot.state.wi.us.

CRREL Cold Weather Concrete Home Page
www.crrel.usace.army.mil/concrete/index.html

Intersection Warning for the Visually Impaired

The Federal Highway Administration recently issued guidelines that will require municipalities and states to install "truncated domes" on handicap access curb ramps in all future projects. These raised patterns in the sidewalk ramp surface are designed to provide visually impaired pedestrians a detectable warning of a transition into traffic areas.

To prepare for implementing the guidelines, WisDOT performed trial installations of various truncated dome designs, materials and installation procedures in the fall of 2002 in partnership with FHWA, the city of Madison and Minnesota DOT. Installations will be evaluated through the winter and spring for constructability, durability, aesthetics, cost and conformance to the new standard.



TAU engineers are evaluating several kinds of truncated domes.

For more information contact TAU engineer Peter Kemp at peter.kemp@dot.state.wi.us.

Photos of trial installations
www.dot.wisconsin.gov/library/research/docs/finalreports/tau-finalreports/domes.pdf

WISCONSIN HIGHWAY RESEARCH PROGRAM

WHRP Web site
www.whrp.org

Investigators contracted through the Wisconsin Highway Research Program carry out materials and construction research for WisDOT in the areas of rigid and flexible pavements, geotechnics and structures. Research projects in each of these areas are overseen by a technical oversight committee, chaired by a WisDOT engineer, with additional members from the Federal Highway Administration, industry and academia. Overall policy direction for the WHRP is provided by a steering committee, chaired by WisDOT's Administrator of the Division of Transportation Infrastructure Development.

UW-Madison's College of Civil and Environmental Engineering is contracted to administer the WHRP program.

Maximizing Service Life of Concrete Structures

Project 0092-00-17

COMPLETED

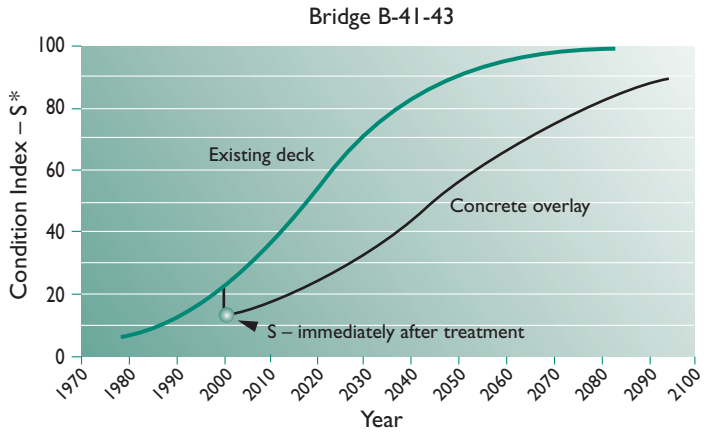
WisDOT ENGINEERS wanted to improve their procedures for maintaining concrete bridge decks. UW–Madison investigators, led by Dr. Teresa Adams, were asked to develop a more systematic approach that would help quantify existing strategies and offer new alternatives. The goal of the research was to develop a tool—in the form of a spreadsheet—that would help engineers account for the corrosive effects of chloride on bridges' steel reinforcement, predict how long a particular bridge deck is likely to last and select the best course of treatment to make it last longer.

Building on a previous US DOT spreadsheet model, investigators developed the BridgeDeck-LCCA (Life Cycle Cost Analysis) which constructs a performance curve for existing bridge decks, computes the estimated service life of common treatments for bridge decks (patching, overlays) as well as the service life of a new deck with epoxy-coated bars.

Combined with other strategies and techniques recommended by the research team, the Bridge Deck-LCCA spreadsheet will help district bridge engineers choose the most cost-effective repair strategies.

The final report and brief are online at *www.dot.wisconsin.gov/library/research/reports/bridges.htm*

For more information contact Stan Woods at *stan.woods@dot.state.wi.us.*



Bridge deck performance curves with and without treatment using a concrete overlay.

* 0 = Best condition
100 = Worst condition

SUMMARY OF WISDOT FUNDING TO WHRP

FFY	Annual WisDOT Commitment	Steering Committee Awards			Contracted Amounts [3]
		Projects	*Admin*	*Total*	
1999 [1]	$410,511	$285,511	$125,000	$410,511	$410,511
2000	$500,000	$709,131	$125,000	$834,131	$838,341
2001 [2]	$750,000	$449,792	$62,470	$512,262	$510,080
2002	$1,000,000	$979,074	$133,509	$1,112,583	$1,067,083
2003	$1,000,000	$849,214	$124,991	$974,205	$120,034
Total	$3,660,511			$3,843,692	$2,946,049

1 WisDOT enters contract with UW-Madison to administer the WHRP, providing funding for four research projects plus administrative costs.

2 WHRP shifts to funding total project costs in a single fiscal year. Fewer dollars are directed to FFY 2001 projects in order to balance previous year's commitments.

3 Includes contracts encumbered as of 9-30-02.

New WHRP Projects — FFY 2003

0092-03-09

Evaluation of Concrete Deck and Crack Sealers

Investigators will conduct a systematic assessment of deck and crack sealers in terms of their effectiveness and life performance. The project will include a review of the products currently approved and in use by the Wisconsin DOT. New products will also be considered in the initial review. A myriad of products will be subjected to laboratory and field testing.

0092-03-10

Integrated Field and Office Tools for Bridge Management

Currently, bridge inspectors are limited in terms of the material they can reference while in the field and the tools they can use to capture the nature and location of defects found on bridge elements. This project will develop a Field Inspection Support Tool for bridge inspectors to use while inspecting and recording bridge maintenance activities and associated costs.

0092-03-11

Determination of Typical Resilient Modulus Values for Selected, Representative Soil Distributions

Investigators will develop a methodology for estimating the resilient modulus or stiffness of various Wisconsin subgrade soils from basic soil properties. Soil parameters will be correlated with resilient modulus measurements in the laboratory and field, using Light Drop Weight (LDW), Dynamic Cone Penetrometer (DCP) and Soil Stiffness Gauge (SSG) tests.

0092-03-12

Development of Methodology to Include the Strength Contribution of Select Subgrade Materials in Pavement Structure

Investigators will analyze the improvement of subgrade soil strength due to the use of select subgrade materials and stabilization mechanisms. A methodology will be developed to incorporate the anticipated improvements in the pavement design process taking into account factors other than mechanical improvement.

0092-03-13

Field Validation of Wisconsin Modified Binder Selection Guidelines

Investigators will design and implement a field study for the validation of binder (asphalt) grade selection guidelines for Wisconsin and establish a system for continuous monitoring of performance and periodic revisions of the guidelines as more performance data is collected.

0092-03-14

Development of Modulus-to-Temperature Relations for HMA Mixtures in Wisconsin

Investigators will develop comprehensive modulus-to-temperature relations for the range of Hot Mix Asphalt mixtures used in Wisconsin, both in terms of mix type and pavement age. Included in the project are a literature review, data analysis, field testing and recommendations for potential changes in WisDOT design procedures.

0092-03-15

Investigation of New Devices for Use in Determining Mechanistic Properties and Performance

Investigators will evaluate the mechanical properties and parameters recommended by AASHTO in terms of their correlation with field performance, repeatability and sensitivity to critical volumetric parameters of asphalt concrete. Devices used to measure these properties will be evaluated for ease of use, repeatability and cost.

0092-03-16

Evaluation of Methods for Characterizing Air-Void Systems in Wisconsin Paving Concrete

Investigators will examine the relationships between various methods of measuring air-void system parameters in fresh concrete and for characterizing it in hardened concrete. They will correlate measured air-void systems parameters with freeze-thaw testing data and do a literature synthesis to document best construction practices and materials selection for producing a consistent, adequate air-void system in concrete pavements.

See *Research Project Guide* for funding details and contact names.

MIDWEST REGIONAL UNIVERSITY TRANSPORTATION CENTER (MRUTC)

The Midwest Regional University Transportation Center is a consortium of seven midwestern universities, led by the University of Wisconsin-Madison. Dedicated to the complementary goals of research, education and technology transfer, the MRUTC focuses on issues related to transportation asset management. WisDOT provides partial funding to the operation of the MRUTC and works closely with them in a variety of ways.

Other consortium members include:

- University of Wisconsin-Milwaukee
- Northwestern University
- University of Cincinnati
- Marquette University
- Lac Courte Oreilles Ojibwa Community College
- Richard J. Daley City College

MRUTC research projects to which WisDOT has contributed funding:

- Asset Management Web site
- National Workshop on Transportation Asset Management
- Synthesis of National Transportation Asset Management Activities
- Evaluation of Transportation Outsourcing: Decision Making Criteria for Out-sourcing Opportunities
- Evaluation of Near Transportation Private Sector Asset Management Practices
- Best Practices for Linking Strategic Planning to Resource Allocation and Implementation Decisions Using Elements of a Transportation Asset Management Program
- Deer-Vehicle Crash Information Clearinghouse
- Synthesis of Best Practices for the Development of an Integrated Data and Information Management Approach
- Capital Preventative Maintenance

Reports on these and other MRUTC projects, workshops and upcoming events are available on the MRUTC Web site at *www.mrutc.org/researchrfp.htm* and in its annual reports at *www.mrutc.org/annualreports/.*

SUMMARY OF WISDOT FUNDING TO MRUTC

FFY	Annual WisDOT Commitment
2001	$450,000
2002	$450,000
2003	$200,000

MRTUC Web site
www.mrutc.org

Building a national transportation knowledge network for the 21st century

Nina McLawhorn
WisDOT Research Administrator

In the four years since Congress called for creation of the National Transportation Library, a consensus is emerging on the need for a national transportation knowledge network. Knowledge is the key to preserving the U.S. transportation industry's competitive edge in today's global, knowledge-based, technology-intensive economy. Transportation organizations that value innovation in product development and creativity in their workforces will thrive.

Yet increased demands on staff time for program delivery, combined with downsizing and an aging workforce, are straining organizational capacity to meet current and future challenges. DOT engineers and managers increasingly face information overload from an explosion of sources and have little time for critically analyzing information for daily or strategic decision-making.

These challenges demand greater investment in research, libraries, training, and rapid-response services to transform information into knowledge. The investment will pay off. The Minnesota Department of Transportation calculated that for its FY2001 investment of approximately $700,000 in library and information services, it realized a $8.4 million return in reduced costs and added value for a benefits to cost ratio of 12 to 1 *(see www.dot.state.mn.us/library/access.html.)*

Awareness of the value of transportation information and information services is growing rapidly. Recent developments include:

- The National Transportation Library (NTL) was created in 1998 to improve "the availability of transportation-related information needed by federal, state and local decision-makers…" for "policy, research, operations, and technology transfer activities."
- The 1998 Federal Highway Administration publication, *Value of Information and Information Services,* documents the ways in which information services can (1) reduce agency costs, accelerate technology development and improve operations; (2) speed the implementation of innovations; and (3) lead to more effective decision making at all levels of an agency.
- A National Cooperative Highway Research Program scoping study (20-7/142) for a National Strategic Plan for Transportation Information Management is nearly complete. The scoping study, undertaken at the urging of the AASHTO Research Advisory Committee (RAC), will underline the importance of moving forward to preserve and expand the transportation information infrastructure.
- The NTL is conducting a pilot project, the Midwest Transportation Knowledge Network, as the first of several regional efforts to create: 1) a national collaborative transportation library network and 2) a union catalog for transportation materials through partnership with the OCLC (Online Computer Library Center).

State and national organizations are already moving in innovative ways to promote the value of transportation research and information. Many of these efforts provide forums for continued dialogue on how to improve services and build a national transportation knowledge network.

- ***State DOT Examples. WisDOT*** is working hard to provide access to our own and other states' research and technology efforts through our new Research and Library Web pages and rapid-response Transportation Synthesis Reports (TSRs). ***Connecticut DOT*** is using digital video to tell the story of key research projects. ***Utah DOT*** has launched media campaigns to market the value of its research to the public. ***Kansas DOT*** is digitizing its entire technical library for easier access. ***Virginia DOT*** has created an office of Transportation Knowledge Management.
- ***FHWA*** is restructuring its RD&T program with a Corporate Master Plan. Its Office of Professional Development is identifying transportation professionals' training needs through the "New People-New Technology" initiative.
- ***TRB*** is publishing a new electronic newsletter and plans to develop thematic CD-ROMs on critical topics and prepare one-page summaries of key NCHRP research projects.
- ***AASHTO*** is creating a world-class transportation Web portal to provide access to "a knowledge network for transportation professionals."
- ***AASHTO RAC***, under Florida DOT's leadership, is developing a toolbox and national marketing strategy to measure and communicate the benefits of state DOT research programs.

WisDOT & PARTNER COMMITTEES

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Ron Adams, Division of Transportation Infrastructure Development
Rod Clark, Division of Transportation Investment Management
Joe Maassen, Executive Offices
Dwight McComb, Federal Highway Administration
Dan McGuire, Division of State Patrol
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Jeff Western, Division of Business Management

WisDOT Technology Advancement Unit

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Debra Bischoff, Technology Advancement Engineer
Peter Kemp, New Products Engineer
Steve Krebs, Pavements Section Chief
David Larson, Technology Advancement Supervisor
Joe Wilson, Technology Advancement Specialist

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Patrick Casey, Casey Technical Communications
Mark Chandler, FHWA Technology Transfer Engineer
John Cherney, Head Librarian
Nina McLawhorn, Research Administrator
Rob Miller, Office of Public Affairs
Jean Trumpy, District 2 Librarian

Midwest Regional University Transportation Center

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Jason Bittner, Program Manager
Howard Rosen, Continuing Education Director
Jeffrey S. Russell, Principal Investigator
Aileen Switzer, Research Manager
Ernie Wittwer, Director

Wisconsin Highway Research Program

Peter Bosscher, Director
Aileen Switzer, Program Manager

Wisconsin Highway Research Program

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Wisconsin Highway Research Program

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Mike Pheifer, Pheifer Brothers Construction
Joe Quist, Lunda Construction Company
Tom Strock, Federal Highway Administration
Stan Woods, WisDOT, Chair
Bob Wysocki, HNTB Corporation

Wisconsin Department of Transportation

Research Coordination Section
4802 Sheboygan Ave., Rm. 451
P.O. Box 7965
Madison, WI 53707-7965
608-266-3199
www.dot.wisconsin.gov/library/research

2002 ANNUAL REPORT

RESEARCH PROJECT REFERENCE GUIDE

Active Projects

Sixty-one research projects were active during FFY 2002. They are listed in chronological order by start date on the foldout.

- Years shown are Federal Fiscal Years – October 1 through September 30
- Project timelines are current as of September 30, 2002
- 12 new projects started
- 22 projects finished

New Projects

WisDOT selected 16 new research projects for FFY 2003. These are listed by category on the reverse side of the foldout.

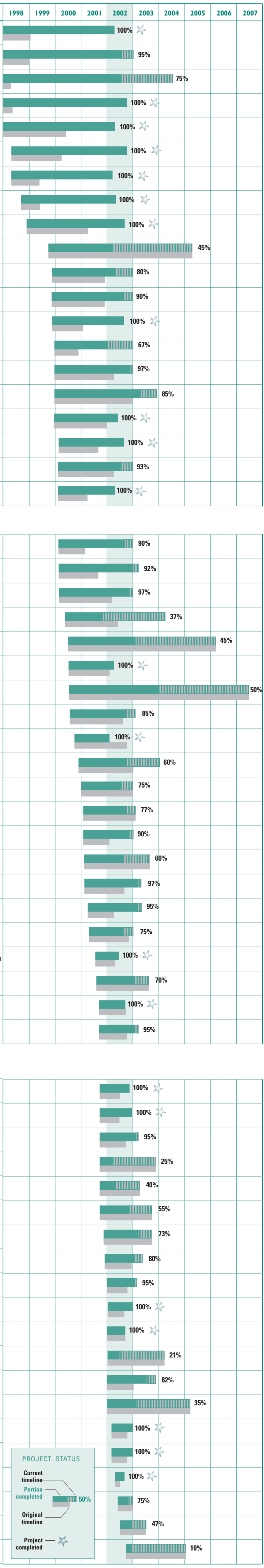
Pooled Fund Projects

WisDOT contributes to 22 joint research projects with other agencies. They are listed by category on the reverse side of the foldout.

For current information on all projects, see the WisDOT Research and Library Web pages at: www.dot.wisconsin.gov/library/research/reports/

PROGRESS OF ACTIVE RESEARCH PROJECTS — FFY 2002

Project ID	Category	Performing Organization	Investigator	Admin	Cost	WisDOT Contact	Project Title
0092-45-87	Asphalt Pavement	Wisconsin Department of Transportation	Debra Bischoff	TAU	$35,000	david.larson @dot.state.wi.us	Stone Matrix Asphalt
0092-45-52	Asphalt Pavement	Wisconsin Department of Transportation	Debra Bischoff	TAU	$21,000	david.larson @dot.state.wi.us	Recycling Rubber Modified Asphalt
0092-45-79	Concrete Pavement	Marquette University	James Crovetti	TAU	$72,556	david.larson @dot.state.wi.us	Cost Effective Concrete Pavement Cross Sections
0092-45-81	Bridges	Marquette University	Thomas Wenzel	TAU	$60,000	david.larson @dot.state.wi.us	Performance Based Specifications for Bridge Decks
0092-45-76	Concrete Pavement	University of Wisconsin–Madison	Steven Cramer	TAU	$113,370	david.larson @dot.state.wi.us	Strategies for Enhancing the Freeze-Thaw Durability of PCC Pavements
0092-45-97	Policy and Planning	Wisconsin Department of Transportation	Dennis Leong	COR	$69,724	dennis.leong @dot.state.wi.us	Transportation Investments, Economic and Land Use Goals
0092-45-96	Environment	State Historical Society of Wisconsin	Jennifer Kolb	COR	$49,470	shirley.stathas @dot.state.wi.us	Development of Pilot Archaeological Database (PAD) for WisDOT District 3
0092-45-95	Soils and Foundations	Marquette University	James Crovetti	TAU	$169,900	debra.bishoff @dot.state.wi.us	QA/QC Subgrade Specifications Development
0092-45-82	Environment	Wisconsin Department of Transportation	Thomas Martinelli	COR	$115,346	thomas.martinelli @dot.state.wi.us	Pollutant Loadings to Storm Water Run-Off from Highways: The Impact of a Sweeping Program
0092-00-20	Concrete Pavement	Wisconsin Department of Transportation	Debra Bischoff	TAU	$125,000	debra.bishoff @dot.state.wi.us	Investigative Study of the Italgrip System
0092-45-15	Soils and Foundations	University of Wisconsin–Madison	Tuncer Edil	WHRP	$55,000	robert.arndorfer @dot.state.wi.us	Effectiveness of Geosynthetics in Stabilizing Soft Subgrades
0092-45-18	Soils and Foundations	University of Wisconsin–Madison	Tuncer Edil	WHRP	$95,000	kenneth.hanzel @dot.state.wi.us	Field Performance of Sub-bases Constructed with Industrial Byproducts
0092-45-19	Operations	University of Wisconsin–Madison	Teresa Adams	COR	$90,000	stan.woods @dot.state.wi.us	Design/Prototype of Automated Routing and Evaluation of Bridge Restrictions for Oversize/Overweight Permitting
0092-00-04	Asphalt Pavement	University of Wisconsin–Madison	Hussain Bahia	WHRP	$45,776	leonard.makowski @dot.state.wi.us	Minimum Pavement Thickness for Superpave Mixes
0092-00-07	Concrete Pavement	University of Wisconsin–Madison	Steven Cramer	WHRP	$97,740	david.larson @dot.state.wi.us	Effects of Aggregate Coatings and Films on Concrete Performance
0092-00-12	Soils and Foundations	University of Wisconsin–Madison	Craig Benson	WHRP	$100,616	robert.arndorfer @dot.state.wi.us	Equivalency of Subgrade Reinforcement Methods
0092-00-17	Bridges	University of Wisconsin–Madison	Teresa Adams	WHRP	$50,000	stan.woods @dot.state.wi.us	Assessment and Rehabilitation Strategies/Guidelines to Maximize the Service Life of Concrete Structures
0092-45-16	Concrete Pavement	University of Wisconsin–Madison	Steven Cramer	WHRP	$55,510	david.larson @dot.state.wi.us	Field Measurement of Water Cement Ratio for Portland Cement Concrete—Phase II
0092-45-98	Asphalt Pavement	University of Wisconsin–Madison	Hussain Bahia	WHRP	$80,001	leonard.makowski @dot.state.wi.us	Field and Lab Evaluation of Superpave Mixtures Designed with Different PG Grades and Aggregate Angularity
0092-00-02	Operations	University of Wisconsin–Madison	Robert Smith	COR	$40,000	sandra.huxtable @dot.state.wi.us	Improved Use of the Inspection Selection System (ISS) for Motor Carrier Safety
0092-00-05	Asphalt Pavement	Marquette University	James Crovetti	WHRP	$45,000	leonard.makowski @dot.state.wi.us	Development of Rational Overlay Design Procedures for Flexible Pavements
0092-00-08	Concrete Pavement	Marquette University	Alex Drakopoulos	WHRP	$75,000	david.larson @dot.state.wi.us	Wet Pavement Crash Study of Longitudinally and Transversely Tined PCC Pavements
0092-00-15	Bridges	University of Wisconsin–Milwaukee	Al Ghorbanpoor	WHRP	$49,745	stan.woods @dot.state.wi.us	Non-Destructive Testing of Highway Bridge Structures for Purposes of Structure Evaluation
0092-00-01	ITS	University of Wisconsin–Milwaukee	Edward Beimborn	COR	$190,000	richard.martin @dot.state.wi.us	Evaluation of Implementation Issues for Automatic Vehicle Locator (AVL) Systems for WI Transit Services
0092-00-11	Concrete Pavement	Marquette University	James Crovetti	WHRP	$39,857	david.larson @dot.state.wi.us	Portland Cement Concrete Pavement over Rubblized PCC
0092-00-06	Asphalt Pavement	University of Wisconsin–Madison	Hussain Bahia	WHRP	$50,000	leonard.makowski @dot.state.wi.us	Determining a Temperature-Density Relationship after Completed Rolling of HMA
0092-00-13	Soils and Foundations	University of Wisconsin–Milwaukee	Sam Helwany, Al Ghorbanpoor	WHRP	$99,979	robert.arndorfer @dot.state.wi.us	Evaluation of Bridge Approach Settlement Mitigation Methods
0092-00-16	Bridges	Marquette University	Chris Foley	WHRP	$49,969	stan.woods @dot.state.wi.us	Structural Analysis of Sign and Luminaire Support Structures
0092-45-14	Safety	Laurits R. Christensen Associates, Inc.	Stacey McCullough	COR	$89,842	eileen.ostrowsky @dot.state.wi.us	Licensing the High Risk Driver
0092-00-03	Environment	United States Geological Survey	Judy A. Wierl	COR	$75,000	robert.pearson @dot.state.wi.us	Evaluation of Storm Water Treatment Technologies for Highway Runoff
0092-45-17	ITS	University of Wisconsin–Milwaukee	Bin Ran	COR	$150,000	john.corbin @dot.state.wi.us	Benefit Evaluation of Ramp Meters and Variable Message Signs in Wisconsin
0092-01-02	Asphalt Pavement	University of Wisconsin–Madison	Hussain Bahia	WHRP	$55,337	leonard.makowski @dot.state.wi.us	Using the Gyratory Compactor to Measure the Mechanical Stability of Asphalt Mixes
0092-00-14	Soils and Foundations	Wag. Komurcka Geotechnical Group, Inc.	Alan Wagner	WHRP	$30,000	robert.arndorfer @dot.state.wi.us	Estimating Pile Setup in Wisconsin
0092-01-01	Asphalt Pavement	University of Wisconsin–Madison	Hussain Bahia	WHRP	$99,828	leonard.makowski @dot.state.wi.us	Guidelines for PG Binder Selection in Wisconsin
0092-01-03	Asphalt Pavement	University of Wisconsin–Madison	Hussain Bahia	WHRP	$50,753	leonard.makowski @dot.state.wi.us	Evaluation of the Extent of Hot Mix Asphalt (HMA) Moisture Damage as it Relates to Pavement Performance
0092-01-07	Policy and Planning	Dieringer Research Group	Laura Cleary	COR	$60,000	sue.hunter @dot.state.wi.us	Examining Stress Levels of DSP Enforcement Personnel and Intervention Techniques
0092-01-06	Bridges	University of Wisconsin–Milwaukee	Habib Tabatabai	WHRP	$124,968	stan.woods @dot.state.wi.us	Rehabilitation Techniques for Concrete Bridges
0092-01-08	Safety	Knupp & Watson, Inc.	Jack Ferreri	COR	$130,000	jeffrey.knupp @dot.state.wi.us	Impact on Highway Safety of Multiple Administrative Driver License Withdrawal Systems
0092-01-05	Soils and Foundations	University of Wisconsin–Madison	Tuncer Edil	WHRP	$58,803	robert.arndorfer @dot.state.wi.us	Evaluation of the Dynamic Cone Penetrometer and Soil Stiffness Gauge for Measuring Subgrade Stability
0092-01-10	Policy and Planning	University of Wisconsin–Madison	Jeffrey Russell	MRUTC	$50,000	nina.mclawhorn @dot.state.wi.us	Synthesis of National Activities in Transportation Asset Management
0092-01-10	Policy and Planning	University of Illinois–Chicago	Sue McNeil	MRUTC	$50,000	nina.mclawhorn @dot.state.wi.us	Evaluation of Near-Transportation Private Sector Asset Management Practices
0092-01-10	Policy and Planning	University of Wisconsin–Madison	Jeffrey Russell	MRUTC	$25,000	nina.mclawhorn @dot.state.wi.us	Asset Management Website
0092-01-10	Policy and Planning	University of Wisconsin–Madison	Jeffrey Russell	MRUTC	$25,000	nina.mclawhorn @dot.state.wi.us	National Workshop on Transportation Asset Management
0092-01-10	Policy and Planning	University of Wisconsin–Milwaukee	Robert Eger III	MRUTC	$50,000	nina.mclawhorn @dot.state.wi.us	Evaluation of Transportation Organization Outsourcing: Decision Making Criteria for Outsourcing Opportunities
0092-01-11	Policy and Planning	University of Wisconsin–Madison	Keith Knapp	MRUTC	$500,000	john.kinar @dot.state.wi.us	Deer-Vehicle Crash Information Clearinghouse
0092-01-04	Concrete Pavement	Marquette University	James Crovetti	WHRP	$58,648	david.larson @dot.state.wi.us	Early Opening of Portland Cement Concrete Pavements to Traffic
0092-01-09	Environment	Wisconsin Dept of Natural Resources	Ed Emmons	COR	$100,000	gary.birch @dot.state.wi.us	Fresh Water Mussel Study
0092-02-01	Soils and Foundations	OMNNI Associates, Inc.	Richard R. Reusser	WHRP	$99,972	robert.arndorfer @dot.state.wi.us	Support Strength of Crushed Aggregate Base Course Due to Gradational, Regional and Source Variations
0092-02-05	Concrete Pavement	University of Wisconsin–Platteville	Samuel Owusu-Ababio	WHRP	$73,467	david.larson @dot.state.wi.us	Performance of Shoulders Adjacent to Concrete Pavements
0092-02-08	Policy and Planning	University of Wisconsin–Milwaukee	Robert Eger III	COR	$64,859	allyn.lepeska @dot.state.wi.us	Wisconsin's Off-Road Fuel-Tax Collection Process: A Midwestern Comparative Analysis and Assessment
0092-02-11	Policy and Planning	University of Wisconsin–Milwaukee	Bin Ran	COR	$10,000	john.corbin @dot.state.wi.us	ITS Data Management and Archiving: Literature and Best Practices Scan
0092-02-12	Policy and Planning	University of Wisconsin–Milwaukee	Alan Horowitz	COR	$10,000	john.corbin @dot.state.wi.us	Perspectives and Expectations by Drivers: Literature and Best Practices Scan
0092-02-14	Concrete Pavement	University of Wisconsin–Madison	Steven Cramer	WHRP	$194,251	david.larson @dot.state.wi.us	Effects of Ground Granulated Blast Furnace Slag in Portland Cement Concrete
0092-02-14	Structures	University of Wisconsin–Madison	Larry Bank	WHRP	$59,069	stan.woods @dot.state.wi.us	Rapid Strengthening of Reinforced Concrete Bridges
0092-02-14	Asphalt Pavement	University of Wisconsin–Madison	Jeffrey Russell	WHRP	$225,321	leonard.makowski @dot.state.wi.us	The Effect of Pavement Lift Thickness on Superpave Mix Permeability and Density
0092-02-17	Policy and Planning	Wisconsin Department of Transportation	Dennis Leong	COR	$10,000	dennis.leong @dot.state.wi.us	Economic and Land-Use Impacts of Highway 29 Corridor: From Chippewa Falls to Abbotsford
0092-02-07	Policy and Planning	Virchow, Krause & Company	Stacy Anderson	COR	$100,000	john.nordbo @dot.state.wi.us	Mechanism to Measure Customer Satisfaction With Products and Services of the Department
0092-02-09	Policy and Planning	De la Torre Klausmeier Consulting, Inc.	Rob Klausmeier	COR	$10,000	stephen.hirshfeld @dot.state.wi.us	Vehicle Inspection and Maintenance (I/M) Programs: Literature and Best Practices Scan
0092-02-10	Policy and Planning	Dieringer Research Agency, Inc.	Richard Yob	COR	$100,000	gary.wentz @dot.state.wi.us	Evaluating the Effectiveness of the Occupational Licensing Program
0092-02-16	Policy and Planning	Cambridge Systematics	Daniel Krechmer	COR	$80,000	phil.decabooter @dot.state.wi.us	Development of Methods for Benefits Assessment of ITS Deployment in Wisconsin — Phase II
0092-03-12	Soils and Foundations	University of Wisconsin–Madison	Tuncer Edil	WHRP	$120,034	robert.arndorfer @dot.state.wi.us	Methodology to Include Strength Contribution of Select Subgrade Materials in Pavement Structures



ACTIVE POOLED FUND PROJECTS

Any federal, state, regional or local transportation agency may initiate a pooled fund research study to address a common challenge. Participants contribute money, talent or other resources to the study, resulting in a larger effort than any one agency could have undertaken and avoiding costly duplication. WisDOT is currently participating in the pooled fund projects identified below. For details see the WisDOT Research & Library Web site.

WisDOT Research & Library Web site
www.dot.wisconsin.gov/library/research/reports/pooledfund.htm

Project ID	Research Category	Project Title	WisDOT Pledge	WisDOT Contact
SPR3 (088)	Asphalt Pavement	Asphalt Pavement Damage Related to Tire Pressure	$30,000	leonard.makowski @dot.state.wi.us
SPR2 (211)	Asphalt Pavement	Bulk Specific Gravity Round Robin Using the Corelok Vacuum Sealing Device	$10,000	leonard.makowski @dot.state.wi.us
TPF5 (021)	Asphalt Pavement	Base Funding for the North Central Superpave Center	$140,000	john.volker @dot.state.wi.us
TPF5 (005)	Bridges	FHWA Curved Steel Bridge Test	$30,000	stan.woods @dot.state.wi.us
TPF5 (066)	Concrete Pavement	Materials Process Optimization for Portland Cement Concrete (WHRP)	$30,000	james.parry @dot.state.wi.us
TPF5 (003)/ SPR2 (219)	Concrete Pavement	Extending the Season for Concrete Construction and Repair	$30,000	david.larson @dot.state.wi.us
TPF5 (014)	Concrete Pavement	Advanced Research of an Image Analysis System for Hardened Concrete	$20,000	david.larson @dot.state.wi.us
SPR2 (183)	Operations	Development of Computer-Based Training (CBT) Lessons (Web-Based Learning Project) for Engineers, Specialists, Technicians	$20,000	jerry.zogg @ dot.state.wi.us
SPR3 (060)	Operations	Phase IV Highway Winter Maintenance Concept Vehicle Project — COMPLETED	$50,000	thomas.martinelli @dot.state.wi.us
SPR3 (068)	Operations	Field Evaluation of CTCLS Series Traffic Signal Load Switches	$113,569	banantha @dot.state.wi.us
SPR2 (207)	Operations	USDOT FHWA Transportation Management Center	$75,000	john.corbin @dot.state.wi.us
SPR3 (104)	Operations	Computer Based, Self-Operating Training System on Anti-Icing/Road Weather Information Systems (AI/RWIS)	$30,000	thomas.martinelli @dot.state.wi.us
SPR3 (071)	Policy and Planning	A New Approach to Assessing Road User Charges	$50,000	robert.kranz @dot.state.wi.us
TPF5 (036)	Policy and Planning	Transportation Asset Management Research Program Pooled Fund (MRUTC)	$300,000	david.vieth @dot.state.wi.us
SPR3 (017)	Safety	Midwest States Crash Testing Program	$409,470	beth.cannestra @dot.state.wi.us
SPR3 (075)	Safety	Midwest States Smart Work Zone Deployment Initiative (MwSWZDI)	$232,380	thomas.notbohm @dot.state.wi.us
SPR3 (076)	Safety	Animal-Vehicle Crash Mitigation Using Advanced Technologies	$50,000	john.kinar @dot.state.wi.us
TPF5 (058)	Safety	Safety Implementation Guides [managed under NCHRP 17-18(3)]	$50,000	david.vieth @dot.state.wi.us
SPR2 (212)	Soils and Foundations	Non-nuclear Testing of Soils and Granular Bases Using the GeoGauge	$24,000	robert.arndorfer @dot.state.wi.us
SPR2 (218)	Soils and Foundations	Determining the Durability of Modular Retaining Wall Blocks	$50,000	robert.arndorfer @dot.state.wi.us
SPR3 (065)	Soils and Foundations	Geosynthetic Reinforcement of the Base Course Layer of Flexible Pavements	$20,000	robert.arndorfer @dot.state.wi.us
TPF5 (001)	Soils and Foundations	Soil Mixing Methods for Highway Application	$60,000	robert.arndorfer @dot.state.wi.us

Research Coordination Section
Wisconsin Department of Transportation
4802 Sheboygan Ave., Rm. 451
P.O. Box 7965, Madison, WI 53707-7965
608-266-3199
www.dot.wisconsin.gov/library/research

NEW WISCONSIN PROJECTS

FFY 2003

WisDOT Research & Library Web site
www.dot.wisconsin.gov/library/research/reports/

These projects have been selected for FFY 2003 funding by the respective research programs and their associated technical committees. Investigators are chosen based on their detailed proposals and work plans for meeting objectives outlined in the problem statements. For details see the Research and Library Web site.

Project ID	Research Category	Project Title	Cost	Admin.	Investigator Organization	WisDOT Contact
0092-03-15	Asphalt Pavement	Investigation of New Devices for Use in Determining Mechanistic Properties and Performance	$34,990	WHRP	Rowan University	leonard.makowski @dot.state.wi.us
0092-03-14	Asphalt Pavement	Development of Modulus-to-Temperature Relations for HMA Mixtures in Wisconsin	$99,891	WHRP	Marquette University	leonard.makowski @dot.state.wi.us
0092-03-13	Asphalt Pavement	Field Validation of Wisconsin Modified Binder Selection Guidelines	$125,006	WHRP	UW-Madison	leonard.makowski @dot.state.wi.us
0092-03-10	Bridges	Integrated Field and Office Tools for Bridge Management	$59,538	WHRP	UW-Madison	stan.woods @dot.state.wi.us
0092-03-09	Bridges	Evaluation of Concrete Deck and Crack Sealers	$91,740	WHRP	UW-Madison	stan.woods @dot.state.wi.us
0092-03-16	Concrete Pavement	Evaluation of Methods for Characterizing Air-Void Systems in Wisconsin Paving Concrete	$199,965	WHRP	Michigan Technological Univ.	david.larson @dot.state.wi.us
0092-00-03	Environment	Additional funding for Evaluation of Storm Water Treatment Technologies for Highway Runoff	$36,000	COR	US Geological Survey	robert.pearson @dot.state.wi.us
0092-03-01	Policy and Planning	Examining Stress Levels of DSP Enforcement Personnel and Intervention Techniques - Phase II	$73,600	COR	TBD	sue.hunter @dot.state.wi.us
0092-03-02	Policy and Planning	Inventory of Electronic Judicial Systems in Wisconsin	$30,000	COR	TBD	anna.biermeier @dot.state.wi.us
0092-03-06	Policy and Planning	Highway 29 Impact (from Abbotsford to Green Bay)	$50,000	COR	WisDOT	dennis.leong @dot.state.wi.us
0092-03-07	Policy and Planning	Transit Benefit Sector Analysis	$100,000	COR	TBD	john.etzler @dot.state.wi.us
0092-03-08	Policy and Planning	WISLR Communication Analysis	$100,000	COR	TBD	scott.bush @dot.state.wi.us
0092-03-04	Safety	Snow Drifting Study	$100,000	COR	TBD	tom.buchholz @dot.state.wi.us
0092-03-03	Safety	Chevron Marker Study	$54,000	COR	TBD	alan.rommel @dot.state.wi.us
0092-03-12	Soils and Foundations	Development of Methodology to include Strength Contribution of Select Subgrade Materials in Pavement Structures	$120,034	WHRP	UW-Madison	robert.arndorfer @dot.state.wi.us
0092-03-11	Soils and Foundations	Determination of Typical Resilient Modulus Values for Selected Soils Representative of the Soils Distributions of Wisconsin	$103,049	WHRP	UW-Milwaukee	robert.arndorfer @dot.state.wi.us

$ 1,377,814